

Compact Fluorescent Lighting For Your Home

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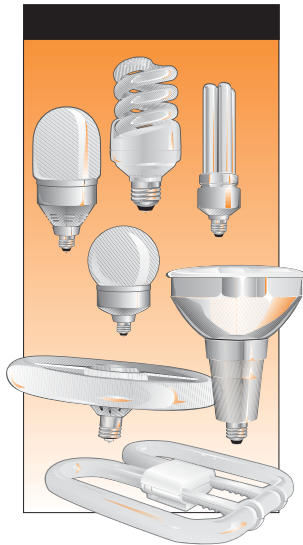
The common incandescent light bulb has been the mainstay of American home lighting since Thomas Edison patented it over a century ago. Everyone knows how to screw one into a socket. They're available at hardware and grocery stores. They're even used to symbolize an idea in cartoons.

After a hundred years, maybe it's time for a new idea.

Edison's light bulb used electric current to heat a filament until it glowed. Today's incandescent light bulb hasn't changed much. A thin tungsten wire is heated to a high temperature, producing light and heat. In fact, most of the energy goes to producing heat.

What Are Compact Fluorescent (CF) Lights?

Compact fluorescent (CF) light bulbs are small fluorescent tubes bent into compact shapes. A CF bulb produces much less heat than an incandescent bulb because it works on a different principle. An electric current passes through a gas sealed in a glass tube, creating invisible ultraviolet rays. When these rays strike the white phosphor coating on the inside of a fluorescent tube, light is produced using one quarter the energy required for the same amount of incandescent lighting.



How much difference can a light bulb make?

Reducing the energy needed for lighting by over two thirds reduces the need for new power generation. Plus, using a light bulb that lasts up to ten times longer than an incandescent bulb reduces the amount of trash created.

The energy savings and trash reduction seem small on a household scale, but the numbers add up. If each of the 330,000 households served by Seattle City Light replaced one ordinary 60-watt light bulb with a 15-watt CF bulb in a light fixture that was on for four hours a day, 22,000 megawatt hours of energy would be saved in a year – enough to provide energy for about 2,000 homes per year.

Why Use CF Lighting?

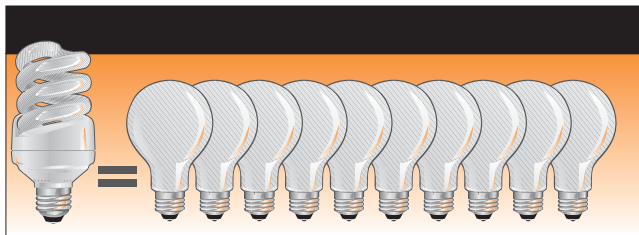
1. High Quality Light

Older fluorescent lighting was sometimes harsh and cold, giving skin tones a blue or green appearance. Manufacturers found that by changing the coating on the inside of the fluorescent tube, they could alter the color of light produced to match the warm quality of incandescent lighting.

Today, most CF bulbs offer the familiar color of light that our eyes are accustomed to seeing at home. No jarring shifts in the color of the couch or odd skin tones. The light from most CF bulbs blends well with the warm light from incandescent bulbs, and new technology enables CF bulbs to come on instantly with no flicker.

2. Long Bulb Life

The common household incandescent light bulb has a rated average life of 750 to 1000 hours. A CF bulb has a rated average life of 10,000 hours. That means if the CF bulb burns an average of three hours per day, you won't have to change the bulb for **5-10 years!**



How is the average life of a light bulb determined?

A sample of bulbs are turned on and off on a regular schedule in a test laboratory. The average rated life of the bulb is the point at which half the test bulbs burned out. At the rated life printed on a light bulb package, half the bulbs in the lab were going strong and half had burned out. The average life does not guarantee a particular bulb's life — it could be longer or shorter.

3. Energy Savings

Fluorescent light uses a quarter to a third as much electricity as an incandescent bulb to produce about the same amount of light. In most homes, lighting is not a large part of the electric bill, so energy savings from a single CF light bulb will not make a big change in your bill. But over the life of the bulb, the energy savings alone will more than pay for the higher cost of the bulb. To calculate energy costs:

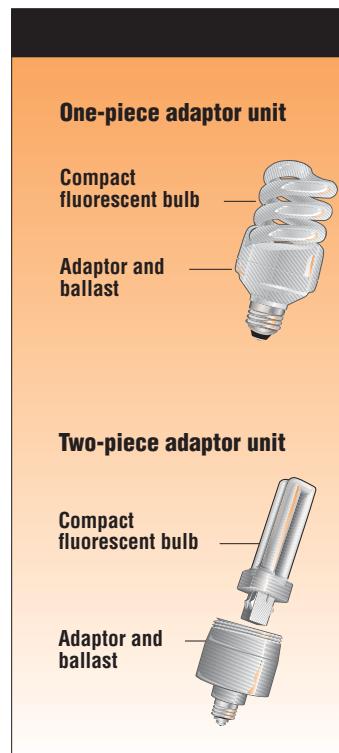
$$\frac{\text{hours} \times \text{wattage}}{1,000} \times .08 = \$ \text{ per kWh}$$

$$\text{Ex: } 6 \text{ hrs} \times 100 \text{ watts} \div 1,000 \times .08 = \$.048$$

What is a Ballast?

All fluorescent lights need a ballast. A ballast regulates the current to the CF bulb so that it starts and operates properly.

- In a one-piece (or modular) bulb, the ballast and bulb are one unit. The ballast is thrown away when the bulb burns out.
- In a two-piece unit, the ballast and bulb are separate. The ballast is built into an adaptor that screws into the socket. When the bulb burns out, the bulb is replaced and the ballast is reused, since a good quality ballast can last 30,000-40,000 hours. Bulb changes cost less with a two-piece bulb.
- In a CF light fixture, the ballast is built into the fixture.



With CF lighting, the ballast and bulb must match. In an all-in-one bulb, the manufacturer matches them for you. In a two-piece unit or a CF fixture, the proper bulb wattage is printed in small letters on the ballast or fixture. When purchasing a replacement bulb, follow the manufacturer's recommendations for good performance.

There are two kinds of ballasts.




- 1) The magnetic ballast has been around the longest, primarily in commercial applications. It is heavier than an electronic ballast, so its weight can cause some freestanding fixtures to be top-heavy. The bulb also flickers a few seconds before coming on.
- 2) An electronic ballast is lighter in weight and eliminates any flickering, and is much more common for residential use. Most CF bulbs sold for home use are one-piece units with electronic ballasts.

How do CF Bulbs Compare to Incandescent Bulbs?

The color and quality of light offered by most CF bulbs is very similar to incandescent lighting. However, when you turn on a CF bulb, it takes 30-90 seconds to come to full brightness, even with an electronic ballast.

The chart below compares bulb wattages and light output. Unless you are looking for a night light or other soft illumination, you'll probably be happier with CF bulbs if you stick with the higher wattages offered.

Wattage Comparison Chart

		
Incandescent Wattage	CF Bulb Wattage	Circular/2D Wattage
25	5	n/a
40	7, 9, 11	n/a
60	13, 15	n/a
75	18, 20, 22, 23	20
100	25, 27, 28	22
150	30	30

Getting Started

When getting to know CF bulbs, it helps to shop at a store with a display of bulbs mounted. Then you can see bulb shapes and sizes and what they look like when they are lit. Prices vary from store to store, so shop around to get the best retail price.


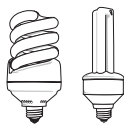
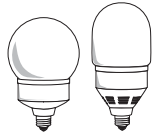
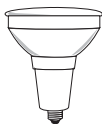
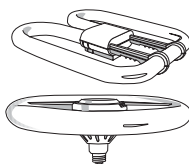
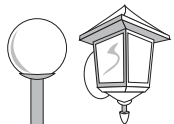




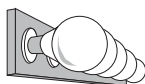
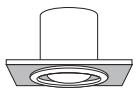
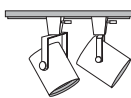


Be sure to look for the **ENERGY STAR** label when buying CF bulbs. This is your assurance of high quality bulbs that have been rigorously tested for superior performance.

Where to Use CF Bulbs

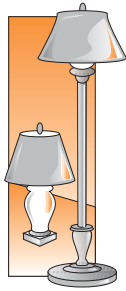
- A light that is on for long periods of time each day, such as a kitchen light or a porch light. You'll see the greatest yearly savings by replacing a light that is used regularly.
- A light fixture that is hard to reach. Since a CF bulb lasts much longer than an incandescent, installing one in a hard-to-reach spot means you'll get the ladder to change a light bulb one tenth as often.
- A fixture where a CF bulb fits easily. Many CF bulbs are larger than standard incandescent bulbs, so space limitations have to be considered.

Where to Use CF Bulbs (continued)

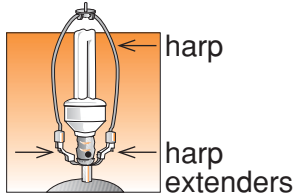
FIXTURES ▼	Spiral or Quad	Globe or Capsule	Flood	2D or Circular
				
Shaded Floor or Table Lamp	GOOD	FAIR	NO	EXCELLENT
 Outdoor Fixture	EXCELLENT	FAIR	NO	NO
Bare Bulb 	FAIR	EXCELLENT	NO	FAIR
 Pendant	GOOD	EXCELLENT	NO	GOOD
Open Ceiling Fixture 	GOOD	NO	NO	GOOD
 Open Wall Fixture	GOOD	FAIR	NO	NO
Make-up Light Fixture 	FAIR	EXCELLENT	NO	NO
 Recessed Ceiling Fixture	FAIR	FAIR	GOOD	NO
Track Lighting 	FAIR	FAIR	GOOD	NO

Installing CF Light Bulbs

Always read the information on the bulb packaging and follow the manufacturers' instructions. Some manufacturers warn against using their products in enclosed light fixtures. The packaging should also tell whether the bulb can be used outside.

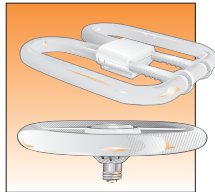


- Floor lamps and table lamps can be good fixtures for CF bulbs but may need alteration of the frame (called a “harp”) that

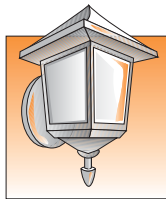


connects the shade to the lamp. If the harp is too small to allow the bulb to fit, you can purchase a longer harp or harp extenders in many hardware and lighting stores.

- 2D and circular fluorescent bulbs provide more light downwards. To install one of these bulbs remove the harp first, install the bulb and then replace the harp.



- Some open or closed porch light fixtures will accommodate CF light bulbs, depending on the manufacturer's instructions. Make sure the bulb is protected from direct exposure to rain and snow.



If the CF bulb is controlled by a photo cell, make sure the bulb and the photo cell are compatible by reading the photo cell manufacturer's instructions.

- A bare bulb in a garage or basement is the simplest replacement to make. Use a globe or capsule shaped bulb with a plastic cover if the bulb needs protection from being hit by a broom handle or tool.

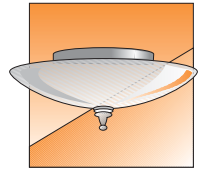


In a garage that sometimes drops below freezing, choose a bulb rated for low temperatures.

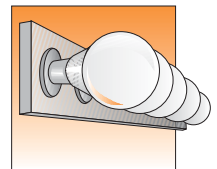
- A pendant light usually is an easy place to install a CF bulb. Using a globe or capsule bulb with a glass or plastic cover in an open fixture will give a look similar to an incandescent bulb.



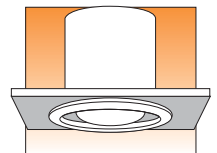
- An open ceiling fixture with a glass plate can often accommodate CF bulbs if a larger glass plate is purchased to cover the extra length of the bulbs. Glass plates are inexpensive and available in hardware and lighting stores.



- Wall-mounted light bars commonly found in bathrooms will often hold CF bulbs. For fixtures that use globe-shaped incandescent bulbs, use globe-shaped CF bulbs.



- Recessed lights are generally not good applications for CF bulbs. Most recessed cans are made for incandescent R or PAR bulbs that are able to punch light from high ceilings to a far wall or



floor. But light from a CF bulb is more diffuse; therefore it tends to weaken over distance much more than incandescent light. If you use recessed cans just for ambient light, you can try a higher wattage CF bulb and see if it works. **NOTE:** You can find CF bulbs with reflectors. They cost a bit more than regular CF bulbs, but work well in outdoor flood lights and may work better in recessed cans than a regular CF bulb.

Using CF Light Fixtures

When you are building a new home or doing major remodeling, you can design fluorescent lighting into your plans. New fixtures that use only CF bulbs are an attractive alternative to retrofitting incandescent fixtures. Look for the **ENERGY STAR** label. CF fixtures are more expensive than incandescent fixtures, since they have a ballast built into the fixture and usually come with a bulb. However, energy savings and less frequent bulb replacements will offset the extra first cost.

With current interest in energy efficient residential lighting, the selection of decorative CF fixtures is growing rapidly. However, since incandescent lighting is still most common, you will usually need to shop in a lighting store or home center store to find these newer fixtures.

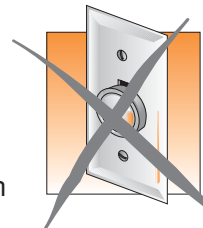
ENERGY STAR fixtures on the market include wall sconces, light bars, decorative ceiling fixtures, porch lights, security lights, landscape lights, and floor plug-in lamps.

If you have difficulty finding **ENERGY STAR** fixtures, ask for the commercial lighting department or see the store manager.

Are There Any Places a CF Bulb Shouldn't Be Used?

Be sure to read the manufacturer's recommendations for uses on the bulb packaging. Some manufacturers suggest the best applications, as well as conditions that are unsuitable for their product. For example, some bulbs are not suitable for use in humid conditions or enclosed fixtures.

- Check the manufacturer's instructions before using a CF bulb with a dimmer switch. While dimmable CF bulbs are available, using a CF bulb not rated for use with a dimmer switch may create a fire hazard.
- Do not install a CF bulb outdoors without protection from exposure to rain/snow.
- Turning a CF bulb on and off frequently (more than 20 times a day) may cause it to burn out early. Therefore, CF bulbs are not good choices for motion sensors.
- In stairways and other areas where light is needed for safety, use a CF bulb with the instant-on feature of an electronic ballast.
- Three-way CF bulbs are now available in most home improvement stores.
- Although halogen torchiere floor lamps cannot be converted to use a CF bulb, you can buy torchiere floor lamps that are made specifically for circular or 2D CF bulbs. Most are either dimmable or have three light levels. Look for the **ENERGY STAR** label.



Glossary

Lumen – A unit of light. A 15-watt incandescent bulb produces about the same number of lumens (850) as a 60-watt incandescent bulb. When purchasing bulbs, get in the habit of comparing lumens, not watts.

Watt – A measure of electric energy. Watts do not measure the amount of light, only energy. Seattle City Light charges its residential customers about 8 cents for every 1,000 watts used per hour. (1,000 watts = 1 kilowatt-hour (kWh)).

Ambient Lighting – Provides an area with overall illumination. It radiates a comfortable level of brightness, enabling one to see and walk about safely.

Task Lighting – Helps you perform specific tasks such as cooking, studying, reading, hobbies or balancing your checkbook.

Accent Lighting – Adds drama to a room by creating visual interest. As part of a decorating scheme, it is used to highlight paintings, houseplants, sculpture or other special possessions.

Incandescent – The name for all light bulbs that have a filament for producing light.

Halogen – A type of incandescent bulb that provides a bright, white light. Has longer life and gives off more lumens-per-watt than regular incandescent bulbs.

R – Used to describe a bulb with a reflective coating. R bulbs produce about double the amount of light as general service bulbs.

PAR – Used to describe a bulb with a parabolic reflective coating. PAR bulbs produce about 4 times the amount of light as general service bulbs.

How to Dispose of CF Bulbs

A CF bulb will last about 5-10 years. When it finally burns out, please don't throw it in the trash. Because CF bulbs and fluorescent tubes contain a small amount of mercury, they must not be thrown away with your regular garbage. Instead, dispose of fluorescent bulbs at a free Household Hazardous Waste (HHW) site, where they will be recycled.

For location and hours of the Seattle HHW site or the King County Wastemobile nearest you, call the Households Hazards Line (M-F, 9:00 am – 4:30 pm, except holidays) at **(206) 296-4692**. Or visit www.seattle.gov/util/services and click on "Hazardous Waste" under "Other Services."

Protect the environment – use fluorescent bulbs and dispose of burned-out fluorescents properly.

For More Information on Home Lighting

- Ask for our free 28-page brochure, *Lighting Your Life – A Home Lighting Guide* published by the American Lighting Association. It compares and describes different light sources, fixtures, controls, and what type of lighting works best in each room of your home.
- For lighting design tips using efficient lighting, go to www.elflist.com

For More Information on Energy Efficiency Services

- Conservation Help Line – **(206) 684-3800**
- Conservation web site – www.seattle.gov/light/conserve